

### **REMARKS/ARGUMENTS**

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. Claims 1-21 were pending in this application. Claims 1-4, 8-10, 15-17 and 19-21 have been cancelled. Claims 5-6, 11-14 and 18 have been amended. Claims 22-29 have been added. No new matter has been introduced. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier. After amending the claims as set forth above, claims 5-7, 11-14, 18 and 22-29 are now pending in this application.

#### **Formality Rejections**

Various of the claims were rejected under 35 U.S.C. § 112, ¶ 1 or ¶ 2 (or objected to under 37 C.F.R. § 1.75(c)). In this regard, as to the rejections involving claims 8, 10, 15, and 17, these claims have been canceled, without acquiescence in the rejection, and only to expedite prosecution of this application. In addition, the language of concern in the remaining claims has been addressed by making the necessary amendments to address the antecedent basis issue, or by canceling the language in question. Applicants believe that the currently pending claims fully comply with section 112.

#### **Prior Art Rejections**

As to the remaining pending claims, claims 5-6 and 9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' Acknowledged Prior Art (hereinafter AAPA) in view of Katoh et al. (U.S. 5,970,184) and in further view of Rossi et al. (U.S. 5,799,029). Further, claim 7 was rejected under section 103(a) over the combination applied against claim 5, further in view of JP 8-174902 to Kinoshita. To the extent these rejections are applied against the present claims, any such rejection is respectfully traversed.

Claim 5 recites in part a light beam scanning apparatus comprising plural light beam generating means, light beam position sensing means, malfunction sensing means for sensing a malfunction using said light beam position means, and control means for stopping the light beam generating means that has malfunctioned.

As disclosed in the specification, according to an image forming apparatus which uses a multi-beam optical system of the present invention, if a malfunction occurs in a light beam generating means or optical path deflection means, an image forming operation can be continued without having to shut down the image forming apparatus until the apparatus can be repaired. As one exemplary embodiment shown in the specification (see, for example, Figures 2, 4 and 14), to sense abnormalities, a polygon mirror 35 is rotated. The light beam of a target (e.g. beam a) and the galvanomirror corresponding to the light beam is operated to have a maximum deflection angle. The galvanomirror then moves the beam downward in relatively large steps (e.g., 100 $\mu$ m). If neither the galvanomirror nor the laser oscillator malfunctions, the light beam will not fail to pass over a sensor pattern S1, and accordingly, sensor pattern S1 outputs a detection signal. Should no detection signal be output from the sensor pattern S1, it is determined that either the laser oscillator or the galvanomirror has malfunctioned.

In an exemplary embodiment of claim 5, detection of abnormalities in beam scanning, i.e. malfunctions in the laser oscillator or galvanomirror, is performed through using the sensor pattern S1 of Fig. 14. The sensor pattern S1 senses a beam scanning position. In this case, the sensor pattern S1 detects malfunctions in beam scanning. Accordingly, the position sensor (also referred to as “light beam sensing means” in claim 5) that senses passing positions of the light beams is used as a malfunction sensor. As shown in Fig. 14, as an example, a position sensor SH, position sensors SA to SG, and a position sensor S2 can also be used as a malfunction sensor (also referred to as “malfunction sensing means” in claim 5).

Thus, claim 5 recites that the malfunction sensing means uses the light position sensing means. By contrast, neither AAPA, Katoh et al. nor Rossi et al. suggest using a position sensor for detecting malfunctions in beam scanning. AAPA discloses a light beam scanning apparatus with scanning means and light beam position sensing means. However, AAPA does not disclose malfunction sensing means for sensing a malfunction and control means for stopping the light emitting operation. Katoh et al. does not cure these deficiencies (and was not cited in the office action for the feature at issue).

Rossi et al. discloses a laser redundancy system using a multiple laser array having plural emitters. If one of the laser emitters fails, the remaining emitters provide output beams that provide stable light intensity. Even if Rossi et al. could be considered combinable with AAPA and Katoh et al., Rossi et al. fails to cure the deficiencies of AAPA and Katoh et al. Rossi et al. does not teach using position sensors for sensing malfunction. Accordingly, claim 5 is patentably distinguishable from the combination of AAPA, Katoh et al. and Rossi et al.

For the reasons given above, Applicants submit that claim 5 is patentable over the art cited in the rejections under 35 U.S.C. § 103(a). Accordingly, Applicants respectfully request that the rejection of claim 5 under U.S.C. § 103(a) be withdrawn. Further, claims 6 and 7 generally depend from claim 5, and are patentable for at least the reasons noted in connection claim 5.

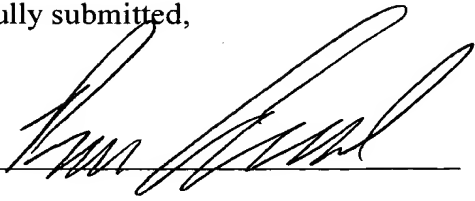
Claims 12 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over AAPA in view of Rossi et al. Claim 14 was rejected under section 103(a) based on AAPA, in view of Rossi et al., and further in view of Kinoshita. Similar to claim 5, claim 12 includes the limitation indicating that the position sensing means are also used as malfunction sensing means. The other limitations being added to claim 12 are not for reasons related to patentability, but rather are being added to claim the invention in a particular manner. Accordingly, claim 12 is patentably distinguishable from the combination of AAPA and Rossi et al for at least the same reasons as claim 5. Claims 13-14 are patentably distinguishable from the combination of AAPA and Rossi et al. by virtue of their dependence from claim 12 as well as their additional recitations. Therefore, applicants respectfully request that the rejection of claims 12-14 under U.S.C. § 103(a) be withdrawn.

#### **Allowable Subject Matter**

Applicants acknowledge with appreciation the indication of allowable subject matter in claims 11 and 18. Claim 11 has been amended to depend on amended claim 6 and has been rewritten to overcome the rejections under 35 U.S.C. § 112. Similarly, claim 18 has been amended to depend on amended claim 12 and has been rewritten to overcome the rejections under 35 U.S.C. § 112. Accordingly, allowance of claims 11 and 18 is solicited.

Respectfully submitted,

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